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(54) **PINCH-ROLLER UNIT OF A MAGNETIC RECORDING/READING APPARATUS**

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(52) **U.S. Cl.** **226/187**; 242/354; 360/95; 360/96.4

(58) **Field of Search** 226/187; 242/338.4, 242/354; 360/85, 95, 96.4, 96.2

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(57) **ABSTRACT**

A pinch roller unit of a magnetic recording/reading apparatus disposed on a main deck on which a head drum and a capstan are disposed to move in association with a sub-deck which is disposed to slide on the main deck. The pinch roller unit operates to bring a tape into close contact with the capstan, and comprises a pivoting lever rotatably disposed on the main deck to pivot towards the capstan in relation to movement of the sub-deck being loaded, a pinch roller rotatably disposed at an end of the pivoting lever and brought into contact with the capstan at the time of loading process, and a torsion spring stressed by being pushed by the sliding member sliding along the left and right directions of the main deck for pushing the pivoting lever towards the capstan.

10 Claims, 3 Drawing Sheets

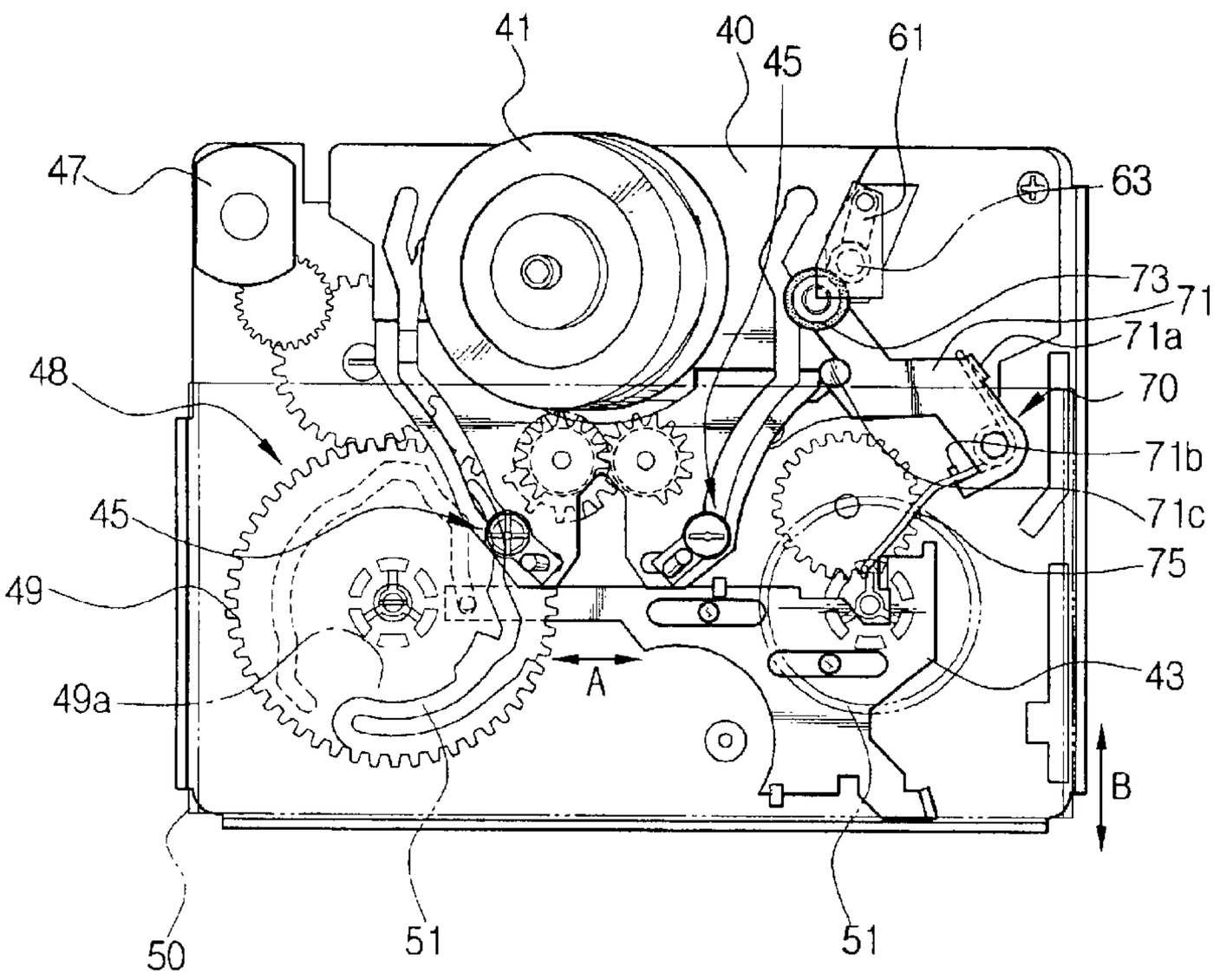


FIG. 1
(PRIOR ART)

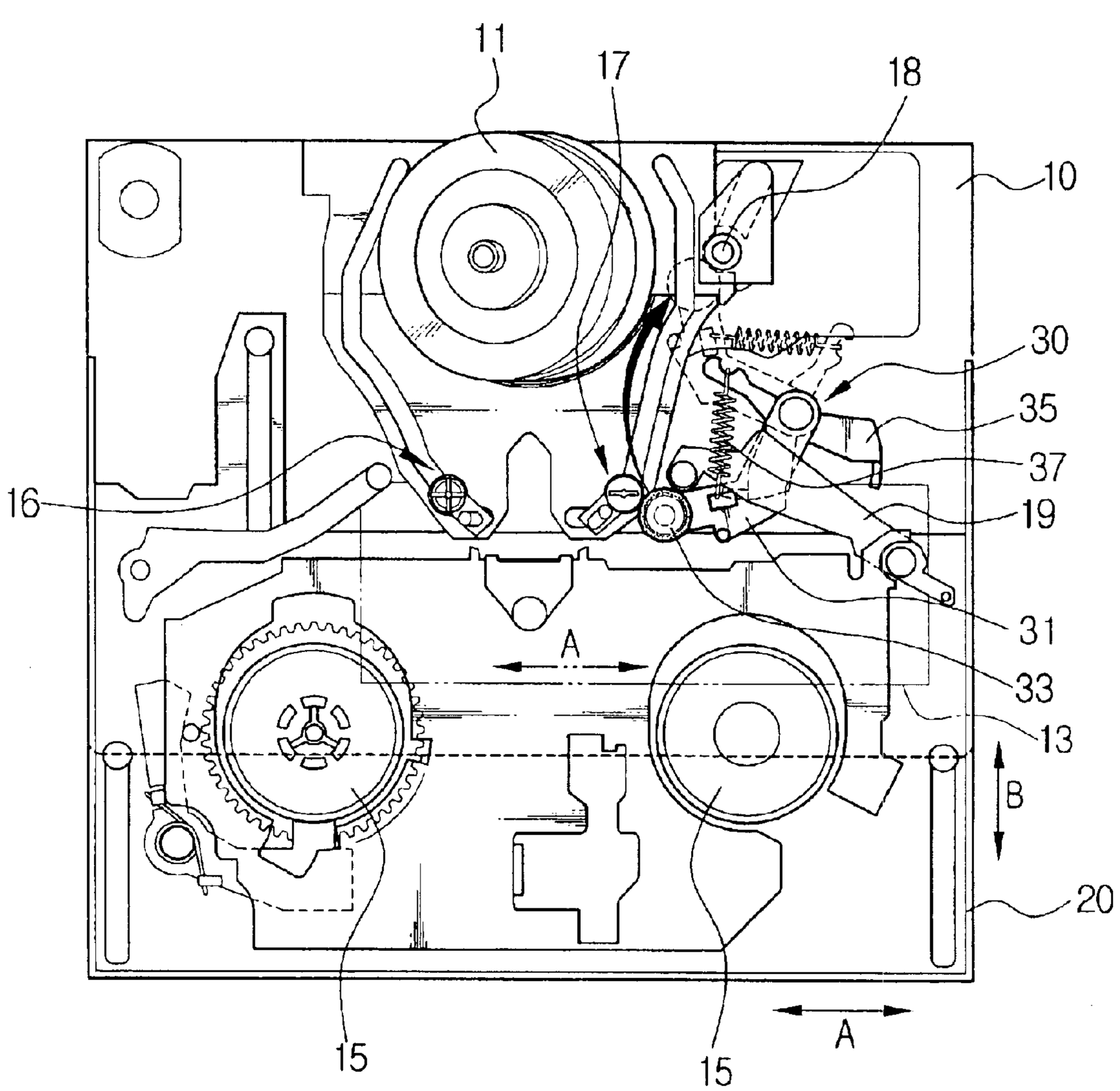


FIG.2

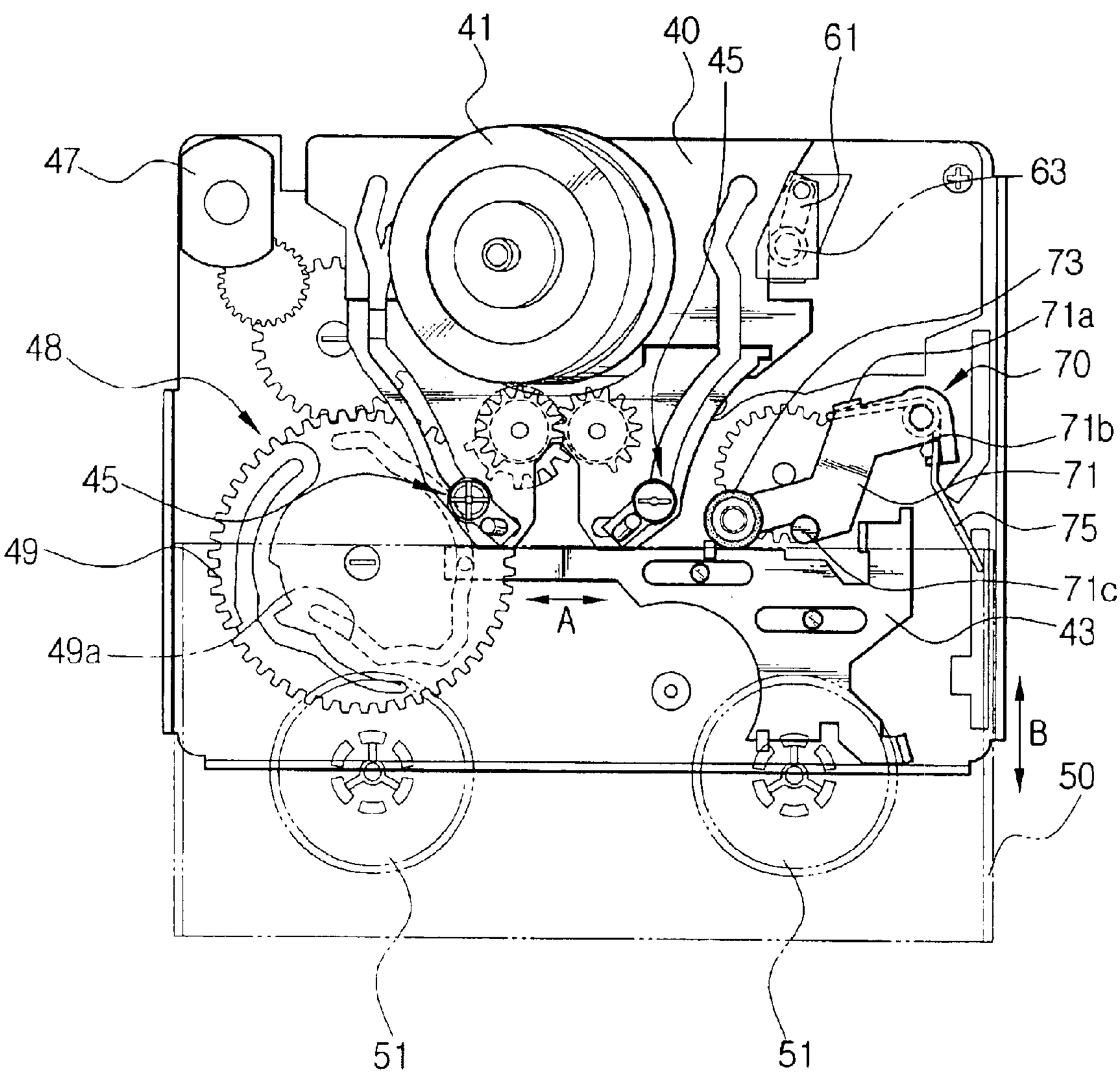
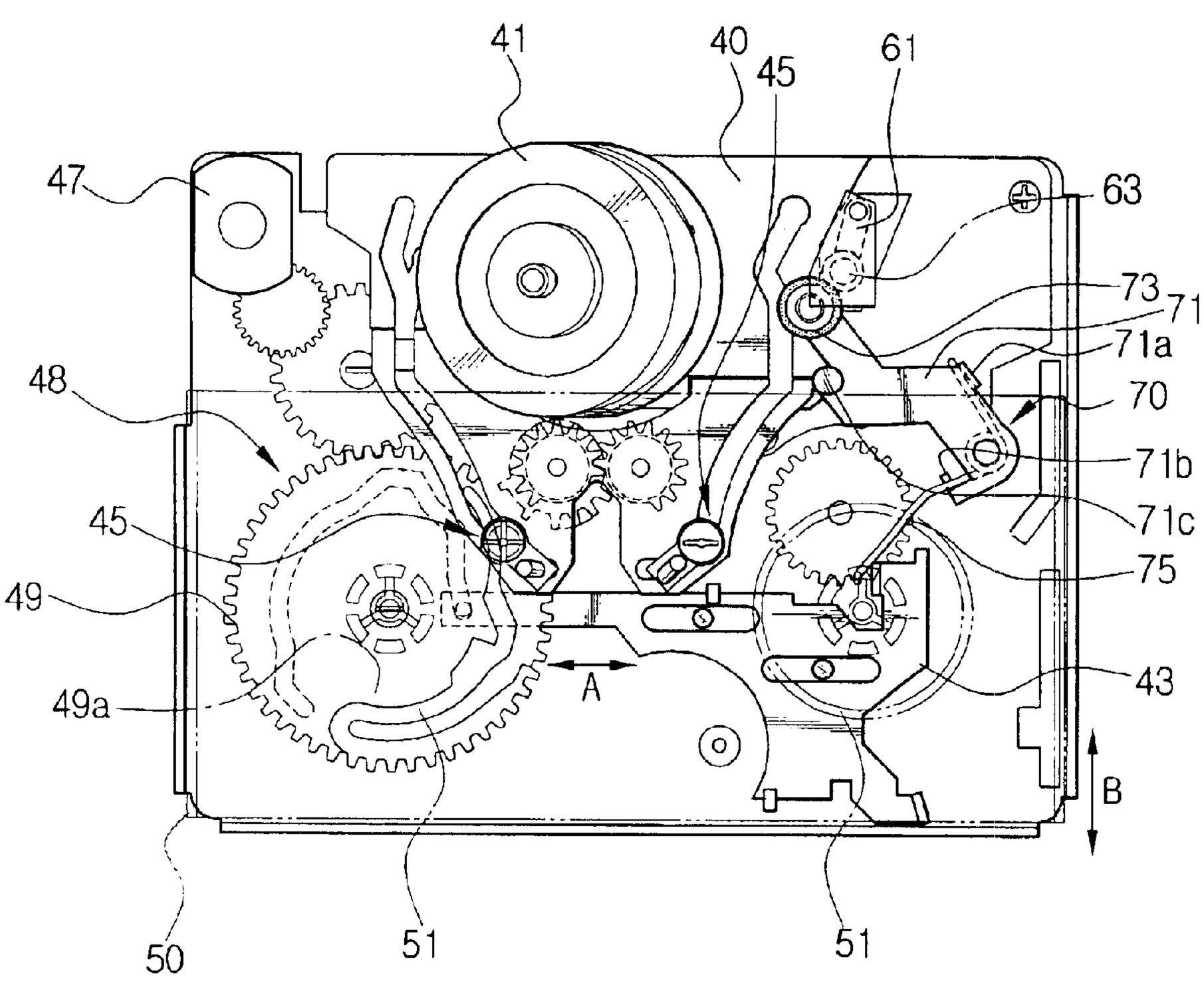


FIG.3



PINCH-ROLLER UNIT OF A MAGNETIC RECORDING/READING APPARATUS

This application claims benefit under 35 U.S.C. § 119 from Korean Patent Application No. 2002-54350, filed on Sep. 9, 2002, the entire content of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a magnetic recording/reading apparatus, and more particularly, to a pinch-roller unit of a recording/reading apparatus for bringing a tape, which has been released from a cassette and loaded to contact a head drum, into close contact with a capstan.

2. Description of the Related Art

Generally, a magnetic recording/reading apparatus is an apparatus for recording information on a recording medium such as a magnetic tape, and reading the recorded information. Types of magnetic recording/reading apparatus include a Video Cassette Tape Recorder (VCR), a camcorder, and so on.

Referring to FIG. **1**, a magnetic recording/reading apparatus comprises a main deck **10** on which a head drum **11** is rotatably disposed, a main sliding member **13** reciprocably disposed on the main deck **10** to slide in the direction A, a sub-deck **20** reciprocably disposed on the main deck **10** to slide in the direction B, and reel tables **15** on which two tape reels of a cassette tape seated on the sub-deck **20** are seated, with one of the reel tables **15** being driven to drive one of the tape reels. The magnetic recording/reproducing apparatus further comprises a pair of pole base units **16** and **17** for moving and supporting a tape to be wound around the head drum **11** when the sub-deck **20** is loaded, and a tape guiding apparatus for guiding the movement of the loaded tape.

The tape guiding apparatus comprises a capstan **18** fixed on the main deck **10**, a pinch-roller unit **30** for bringing the tape into close contact with the capstan **18** in cooperation with the main sliding member **13**, and a review arm unit **19** for providing constant tension to the tape.

In the above-described structure, the pinch-roller unit **30** comprises a pivoting lever **31** pivotably disposed on the main deck **10**, a pinch-roller **33** rotatably disposed at the end of the pivoting lever **31**, a pressing lever **35** rotatably disposed on the axis of the pivoting lever **31**, and an extension spring **37** connecting the pressing lever **35** and the pivoting lever **31**.

The pivoting lever **31** pivots by being pushed by the sub-deck **20** when a tape is being loaded and accordingly, the pinch-roller **33** comes into contact with the capstan **18**. After the sub-deck **20** is loaded, the main sliding member **13** moves, thereby pushing the lower end of the pressing lever **35** to the left. The pressing lever **35** is then rotated clockwise and the extension spring **37** is extended. The pinch-roller **33** is brought into close contact with the capstan **18** by the tension of the extension spring **37**.

It is noted, however, that a disadvantage of the apparatus described above is that the conventional pinch-roller unit **30** having the above-described structure is made up of many parts, thereby requiring large space and a large number of processes to assemble. In addition, a large number of parts increases manufacturing costs.

SUMMARY OF THE INVENTION

An object of the invention is to solve at least the above problems and/or disadvantages, and to provide at least the advantages described below.

Accordingly, one object of the present invention is to solve the foregoing problems by providing a pinch roller unit of a magnetic recording/reading apparatus having fewer parts and a more simplified structure than the conventional apparatus.

The foregoing and other objects and advantages are substantially realized by providing a pinch roller unit of a magnetic recording/reading apparatus that is disposed on a main deck on which a head drum and a capstan are disposed to move in relation to movement of a sub-deck which is disposed to slide on the main deck. The pinch roller unit is capable of bringing a tape into close contact with the capstan and comprises a pivoting lever rotatably disposed on the main deck to pivot towards the capstan in relation to movement of the sub-deck in a loading direction, a pinch roller rotatably disposed at an end of the pivoting lever and brought into contact with the capstan during the loading process, and a torsion spring that is stressed by being pushed by the sliding member sliding in the left and right directions of the main deck to push the pivoting lever towards the capstan.

The torsion spring is coaxially connected with the pivoting lever and prevented from being released from the pivoting lever, and can be stressed and released in a predetermined angle by being pushed by the sliding member.

BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and features of the present invention will be more apparent by describing an embodiment of the present invention with reference to the accompanying drawings, in which:

FIG. **1** is a plan view schematically showing a conventional magnetic recording/reading apparatus;

FIG. **2** is a plan view schematically showing a magnetic recording/reading apparatus having a pinch-roller unit according to an embodiment of the present invention; and

FIG. **3** is a drawing illustrating an example of the operation of a pinch-roller unit when a sub-deck is loaded.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A pinch-roller unit of a magnetic recording/reading apparatus according to an embodiment of the present invention will now be described in greater detail with reference to the accompanying drawings. Elements identical to those shown in FIG. **1** are assigned the same reference numerals.

FIG. **2** is a plan view schematically showing a magnetic recording/reading apparatus having a pinch-roller unit according to an embodiment of the present invention. Referring to the drawing, a head drum **41** is rotatably disposed on the main deck **40**. The main deck **40** has a sliding member **43** disposed to reciprocate in the direction A, and a sub-deck **50** disposed to reciprocate in the direction B. The sub-deck **50** has a pair of reel tables **51** disposed on both sides on which the tape reels of the cassette are to be seated. In addition, the main deck **40** has a pair of pole base units **45** disposed for guiding the tape from the cassette to be wound around a head drum **41** when the sub-deck **50** is in the loaded position. Each pole base unit **45** is driven by a loading system **48** that is driven by the power supplied from a driving motor **47** disposed on the main deck **40**. The loading system **48** comprises a plurality of gears. The sub-deck **50** becomes reciprocatable in the direction B also by the driving motor **47**. Since loading system **48** of the sub-deck **50** is well-known to those in the art, its description will be omitted.

Additionally, a capstan **63** is disposed on the main deck **40** and is rotated by a capstan motor **61**. The capstan motor **61** supplies power for driving the reel table **51** via a power transmission system (not shown). A plurality of guiding poles (not shown) are also disposed on the main deck **40** for guiding the movement of the tape.

The sliding member **43** reciprocates left and right, that is, in the direction A, in relation to movement of a cam gear **49** of the loading system **48**. That is, the sliding member **43** moves in the direction A in association with the cam groove **49***a* formed on the cam gear **49**.

The pinch-roller unit **70** according to an embodiment of the present invention comprises a pivoting lever **71** pivotably disposed on the main deck **40**, a pinch-roller **73** rotatably disposed at the end of the pivoting lever **71**, and a torsion spring **75** coaxially connected to the pivoting lever **71**.

The pivoting lever **71** has one end rotatably disposed with respect to the main deck **40** and the pinch roller **73** disposed at the other end. The pivoting lever **71** is provided with protrusions **71***a*, **71***b* for supporting both ends of the torsion spring **75**. The pinch roller **73**, in contact with the capstan **63**, guides the tape being conveyed when the sub-deck **50** is loaded.

The torsion spring **75** is coaxially disposed on the pivoting lever **71** to be wound around the pivoting shaft. Both ends of the torsion spring **75** are supported by the protrusions **71***a* and **71***b*, and are thereby prevented from being released. When the sub-deck **50** is loaded, the torsion spring **75** is stressed by being pushed by the sliding member **43**, thereby pressing the pivoting lever **71** towards the capstan **63**. Accordingly, the pinch roller **73** can be maintained in close contact with the capstan **63** as shown in FIG. **3**. Also, because the torsion spring **75** is disposed on the pivoting lever **71** for pressing the pivoting lever **71**, a plurality of parts used in a conventional pinch roller unit becomes unnecessary. Therefore, the cost and the number of assembling processes can be reduced, thereby improving the productivity.

The operation of the pinch roller unit **70** having the above-described structure in relation to the loading operation of the sub-deck **50** will now be described.

When the cassette is seated in the sub-deck **50** as shown in FIG. **2**, the sub-deck **50** moves in the direction B. The power generated by the driving motor **47** moves the sub-deck **50** towards the head drum **41**. The sub-deck **50** being loaded comes in contact with a protrusion **71***c* on the pivoting lever **71** and pushes the pivoting lever **71**. Since the sub-deck **50** moves towards the head drum **41**, it can also be referred to as a movable member. As described above, the sub-deck (movable member) **50** can be moved in both a loading and an unloading direction. As shown in FIG. **3**, when the sub-deck **50** is completely loaded, the pinch roller **73** comes in contact with the capstan **63** as the pivoting lever **71** is pivoted. In that state, the sliding member **43** moves to the left direction in the direction A, and thus contacts and pushes an end of the torsion spring **75**. Then, the torsion spring **75** is stressed and the torsion is transferred to the pivoting lever **71**. Accordingly, the pinch roller **73** maintains its close contact with the capstan **63**, thereby smoothly guiding the tape being conveyed through between the pinch roller **73** and the capstan **63**.

As can be appreciated from the description of the pinch roller unit of a magnetic recording/reading apparatus set forth above, the structure in which a single torsion spring is provided to press a pivoting lever that supports a pinch roller can reduce the number of parts significantly when compared to the conventional pinch roller unit. As a result, costs can be reduced and the structure can be simplified. Moreover, the number of assembling processes can be reduced, thereby improving the productivity.

The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present invention. The present teaching can be readily applied to other types of apparatuses. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art.

What is claimed is:

1. A pinch roller unit, adapted to be disposed on a deck of a magnetic recording/reading apparatus on which a head drum and a capstan are disposed, to move in relation to movement of a movable member, which is disposed to move on the deck, to bring a tape into close contact with the capstan, the pinch roller unit comprising:

a pivoting lever, rotatably disposed on the deck to pivot towards the capstan in relation to movement of the movable member;

a pinch roller, rotatably disposed at an end of the pivoting lever and adapted to be brought into contact with the capstan during loading of the movable member; and

a torsion spring that is stressed by being pushed by a sliding member sliding in at least one direction transverse of the deck, to push the pivoting lever towards the capstan.

2. A pinch roller unit as claimed in claim **1**, wherein the torsion spring is coaxially connected with the pivoting lever and prevented from being released from the pivoting lever.

3. A pinch roller unit as claimed in claim **1**, wherein the torsion spring is stressed and released over a predetermined angle by being pushed and released by the sliding member.

4. A pinch roller unit as claimed in claim **1**, wherein the at least one transverse direction is transverse to the movement of the movable member.

5. A pinch roller unit as claimed in claim **1**, wherein the pivoting lever includes a protrusion, such that when the movable member is loaded into the magnetic recording/reading apparatus the movable member comes in contact with the protrusion and pushes the pivoting lever.

6. A pinch roller unit as claimed in claim **1**, wherein the movable member is a sub-deck capable of sliding on the deck in loading and unloading directions.

7. A pinch roller unit, adapted to be disposed on a main deck of a magnetic recording/reading apparatus on which a head drum and a capstan are disposed, to move in relation to movement of a sub-deck, which is disposed to slide on the main deck, to bring a tape into close contact with the capstan, the pinch roller unit comprising:

a pivoting lever, rotatably disposed on the main deck to pivot towards the capstan in relation to movement of the sub-deck in a loading direction;

a pinch roller, rotatably disposed at an end of the pivoting lever and adapted to be brought into contact with the capstan during loading of the sub-deck; and

a torsion spring that is stressed by being pushed by a sliding member sliding in at least one direction transverse of the main deck, wherein the movement is transverse to the movement of the sub-deck, to push the pivoting lever towards the capstan.

8. A pinch roller unit as claimed in claim **7**, wherein the torsion spring is coaxially connected with the pivoting lever and prevented from being released from the pivoting lever.

9. A pinch roller unit as claimed in claim 7, wherein the torsion spring is stressed and released over a predetermined angle by being pushed and released by the sliding member.

10. A pinch roller unit as claimed in claim 7, wherein the pivoting lever includes a protrusion, such that when the sub-deck is loaded into the magnetic recording/reading apparatus the sub-deck comes in contact with the protrusion and pushes the pivoting lever.

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